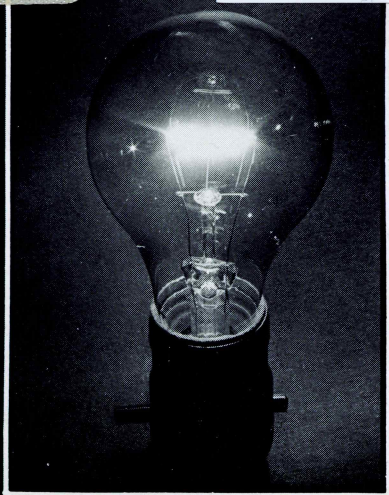


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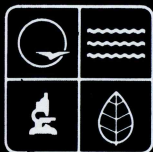
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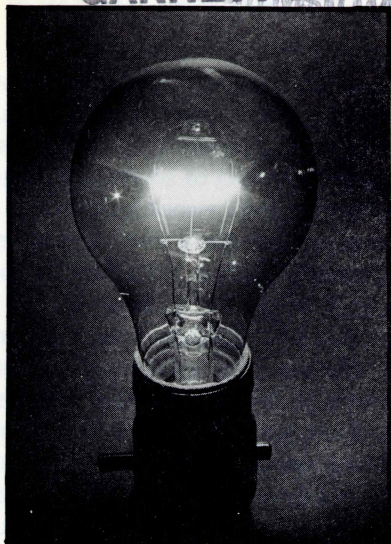
Bright Idea #7



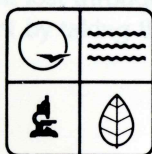
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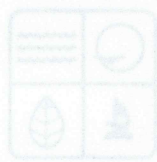


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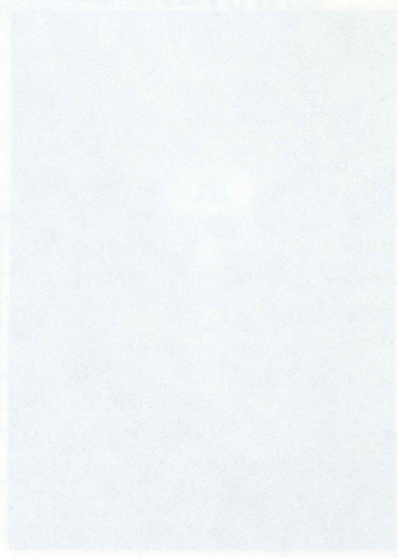
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YOUR WINDOWS

Windows can be more than eyes to your world. On a cold winter day, windows can capture the sun's warmth to help heat your house. On a warm summer's evening, fresh air can drift through windows to cool your house.

However, windows also can rob you of almost half of your heat if not well designed, properly located and sized, and adequately insulated.

Window glass is an excellent conductor of heat and so a poor insulator. The heat gained on a winter's day quickly leaks out after the sun has set. Even with the addition of storm windows, five times as much heat per square foot is lost through a window as through a well-insulated wall. And the heat gained on a summer's day quickly sends the thermostat's needle soaring.

By making the most of your windows, you can live in comfort and pay lower utility bills.

Whether you are building your house from scratch or living in an older house, there are simple steps you can take to insure that your windows work for you.

Sealing those cracks around windows can help keep the heat from going out and the cold drafts from coming in. (Bright Idea #2, "Weatherproofing," has practical information on caulking and weatherstripping windows and doors.)

Nature can help make the most of your windows, too. By careful landscaping, trees can provide windbreak in winter and shade in summer.

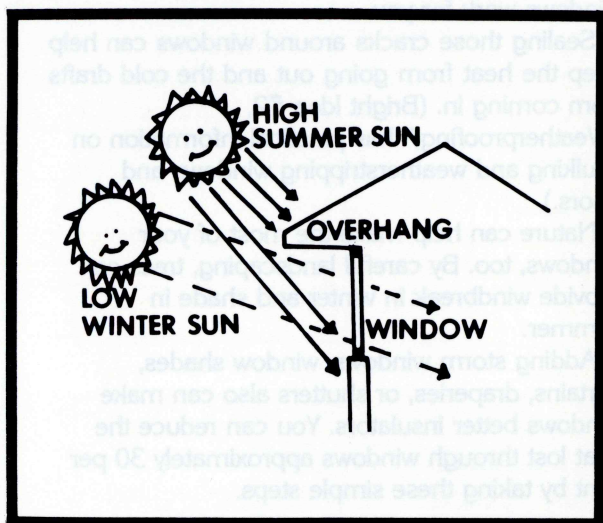
Adding storm windows, window shades, curtains, draperies, or shutters also can make windows better insulators. You can reduce the heat lost through windows approximately 30 per cent by taking these simple steps.

LOCATING YOUR WINDOWS

Windows greatly affect not only indoor climate but also utility bills. When planning the location and size of windows in a new house, you will want to achieve a balance of light, air, and view.

To get the most sunshine in winter and the least in summer, the longest exterior wall of a Missouri house should face south; the sun's winter heat will be captured but summer shade also will be provided. East and west windows also help capture winter heat. These windows, however, may cause overheating problems in the summer. You probably will not want a large window area on the north wall because of the lack of any direct sunlight.

In building a new house, a good investment will be double- or even triple-glazed windows. To minimize air leakage, check the "maximum infiltration" standards on new windows. According to some experts, infiltration rates of no more than $\frac{1}{2}$ cubic foot per minute at a 15 m.p.h. wind are recommended. Be sure to weatherstrip all windows.



Window planning is important

ADDING WINTER WINDOWS

Installing storm windows probably is the first step in treating windows. Storm windows can cut heat loss more than 10 per cent. They not only slow down the cold winter air from seeping inside, but also keep the heated indoor air from leaking outside.

Basically, there are two kinds of storm windows — single and combination.

A single storm window can be made of glass, plastic sheet, or rigid plastic. This type of storm window, which has to be removed in the spring to allow fresh air inside, probably will cost at least \$10 each.

A combination storm window consists of a window and a screen which are fixed permanently over a double-hung window. This type of storm window will cost approximately \$30 each.

Double-glazed or thermopane glass is one type of combination storm window. This window has two sheets of glass with an airspace that traps the air and reduces the heat lost through your window. Double-glazed glass is a very energy efficient storm window. It also is convenient because screens usually are attached for ease in switching from winter to summer window needs.

Now available are triple-glazed windows which may be either three fixed layers or two fixed panes with a storm panel. The flow of heat is effectively blocked with these windows.

There are many storm windows available commercially which differ in design, durability, ease of use, and cost. When buying frames for the windows, you might consider aluminum frames with a "thermal break." These frames usually have vinyl strips built into the frame which stop the heat from flowing through the metal. This breakthrough in aluminum window construction makes them about as effective in preventing heat loss as wood frames.

You can buy storm windows and frames and have them installed by a contractor, or you can buy storm window kits. These kits usually have plastic moldings for the frame and a sheet of plastic along with the instructions on assembling and installing the frames.

A simple, cheap, and effective way to put up your own storm windows is by tacking plastic sheets to your windows. You will need to measure the width and the length of each window. To make your own storm windows, you can buy rolls of polyethylene plastic. This plastic comes in different thicknesses, but generally it is easiest to work with plastic at least six-mil thick. (A mil is 1/1000 of an inch.)

Cut the plastic so that it is slightly larger than the window frame. You will need to leave at least one-inch of "dead air" space between the glass and the plastic in order to insulate against heat loss.

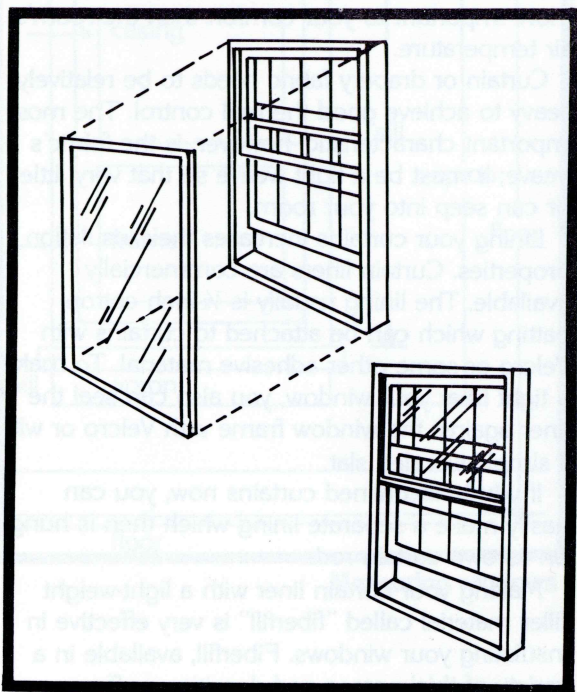
Once the plastic is cut, roll the edges in a thin strip of cardboard and secure the plastic. The plastic can be attached with duct tape or wood lath or other nailing strips. You should nail the plastic tight enough to prevent the wind from getting behind the plastic film and to prevent the plastic from blowing away.

You may choose to build a sturdy, snug fitting frame to hold the plastic. To make such a frame, use 1x2 wood stock and then fasten the corners with metal cleats. The cleats should be applied at an angle to reduce the chance of splitting. By making your frame slightly smaller than the window area and by lining the frame edge with weatherstripping, you will provide a tight fitting barrier to air infiltration. Before attaching the plastic, you can paint or stain the frame.

The plastic can be stapled directly to the frame. Generally, it is simplest to work your way from the center of each side to the corners. Direct stapling, however, can cause ripouts if the plastic is too thin. To prevent such ripouts, you can put a thin cardboard strip or screen door molding tack strip over the plastic and then staple it to the frame.

These plastic storm windows may be placed on the inside or the outside of your house. While they will last longer on the inside, they may smell and look unpleasant. If you decide to place these plastic storm windows on the inside, the edges should be lined with felt or newspaper to make a tight seal.

Whatever kind of storm window you use, be sure there is a tightly caulked seal between the frame of the storm windows and the window frame. Remember, any air leaks will reduce the effectiveness of storm windows.



Storm windows

COVERING YOUR WINDOWS

Trapping a layer of still air between your window glass and another surface will help insulate against window heat loss. One way to trap this air is by putting up window shades, curtains, or draperies. A light-colored, tight-fitting roll shade can reduce the heat loss by 28 per cent and a typical curtain or drapery by six to seven per cent.

Curtains make rooms warmer because their surface temperatures are higher than that of window glass. A room's surface temperature is more important to your comfort than the room's air temperature.

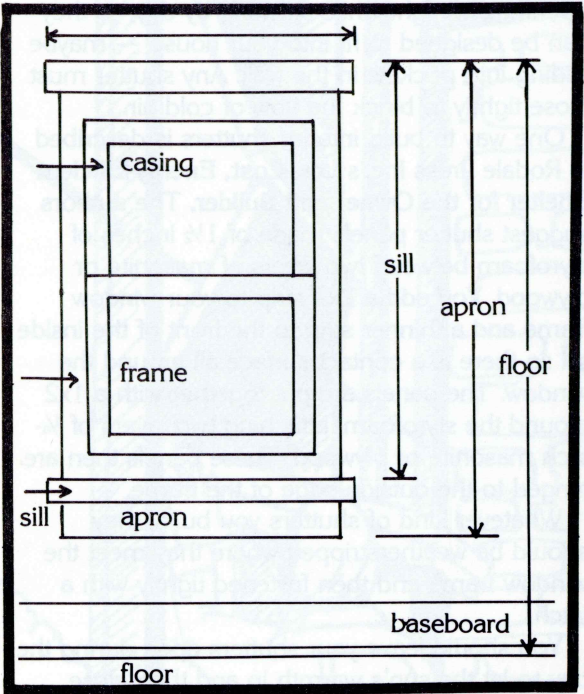
Curtain or drapery fabric needs to be relatively heavy to achieve good thermal control. The most important characteristic, however, is the fabric's weave; it must be a tight weave so that very little air can seep into your room.

Lining your curtains increases their insulation properties. Curtain liners are commercially available. The lining usually is ½-inch cotton batting which can be attached to curtains with Velcro or some other adhesive material. To make a tight fit at your window, you also can seal the liner against the window frame with Velcro or with a simple wooden slat.

If you have unlined curtains now, you can easily make a separate lining which then is hung on its own curtain rod.

Making your curtain liner with a light-weight filler material called "fiberfill" is very effective in insulating your windows. Fiberfill, available in a variety of thicknesses and densities, puffs up and creates an insulating space of dead air. This material is made in both loose stuffing and blanket types; the 2-inch blanket generally is easier to use for curtain liners. The fiberfill then is covered with a thin fabric which is sewn together all around the liner. The liner can be hung separately behind your curtains.

A tight fit is essential for good insulation. A plywood box over the top of the curtain will prevent the warm ceiling air from moving down across the window glass. You also might consider sealing the curtains to the bottom and sides of your window frame.



Measuring windows

SHUTTERING YOUR WINDOWS

Indoor or outdoor insulating shutters combined with double-glazed windows can protect your house from window heat losses almost as well as a well-insulated wall.

You may be able to buy these shutters. But you also can make them at home. Your shutters can swing on hinges; they can fit into window openings at night while stacking by day; or they can be designed to fit into your house — maybe sliding into pockets in the wall. Any shutter must close tightly to block the flow of cold air.

One way to build interior shutters is described in Rodale Press Inc.'s **Low-Cost, Energy-Efficient Shelter for the Owner and Builder**. The authors suggest shutter panels made of 1½ inches of styrofoam between two layers of masonite or plywood. You add a 2x2 strip to your window frame and a thinner strip to the front of the inside sill so there is a contact surface all around the window. The panels are put together with a 1x2 around the styrofoam, attaching two layers of ¼-inch masonite or plywood. These panels then are hinged to the outside edge of the frame.

Whatever kind of shutters you build, they should be weatherstripped where they meet the window frame and then fastened tightly with a latch.

You should leave your shutters open during the day to let the sun's warmth in and then close them during the night to keep the warmth inside. These same shutters can be closed during sunny summer days to reduce excessive heat gain. The shutters at north windows probably should remain closed most of the winter, but open during the summer to provide indirect lighting and fresh air.



Shutters keep in heat

COOLING WITH WINDOWS

By shading your windows in the summer, you can cut down the need to artificially cool your house. If a window is totally shaded and air can circulate through your house, the U.S.

Department of Energy estimates that you can reduce solar heat gain by 80 per cent.

The most effective shading devices generally are outside the window: canvas awnings, shutters, and trees. Shading also can be accomplished architecturally with trellises or roof overhangs. To build an overhang which prevents the high summer sun from entering and yet which allows the winter sun to enter, you can use the following equation:

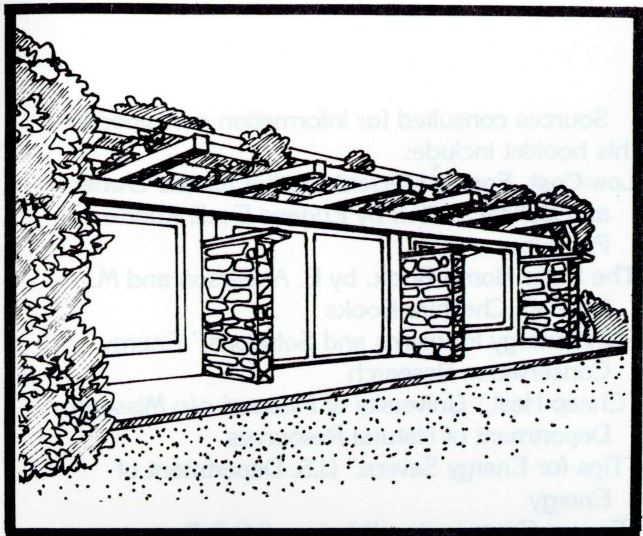
$$\frac{(\text{Latitude in degrees}) \times (\text{window height in inches})}{50}$$

For the latitude in your area, look on any road map; e.g., St. Louis and Kansas City, 39 degrees, and Springfield, 37 degrees.

While not as effective as outdoor shading devices, draperies, curtains, blinds, or window shades also can help cool your house by reflecting the sunlight back outside.

You should draw your curtains or shades on a sunny summer day and then open them at night so the cool air can circulate. To make the most of windows in the winter, you should do the opposite. Keep your curtains or shades open in sunny windows to let the sun's warmth into your house; close them at night or on cloudy days to keep the heat inside.

Rather than losing heat through windows, you can be warmer in winter and cooler in summer by treating your windows. Simply putting up storm windows, curtains, or shutters can help achieve the indoor climate you want. You will be able to look at your world and stay comfortable while you save both money and energy.



Provide shading for windows

COOLING WITH WINDOWS

Sources consulted for information contained in this booklet include:

Low-Cost, Energy-Efficient Shelter for the Owner and Builder, edited by Eugene Eccli, Rodale Press Inc.

The Solar Home Book, by B. Anderson and M. Riordan, Cheshire Books

"Our Energy Problems and Solutions," Energy Conservation Research

"Cheap Heat," University of Missouri c/o Missouri Department of Natural Resources

"Tips for Energy Savers," U.S. Department of Energy

"Energy Conservation: Windows," U.S. Department of Energy

"Putting Up with Storm Windows," Pacific Power

"Energy Conscious Decorating," University of Arkansas Extension Division

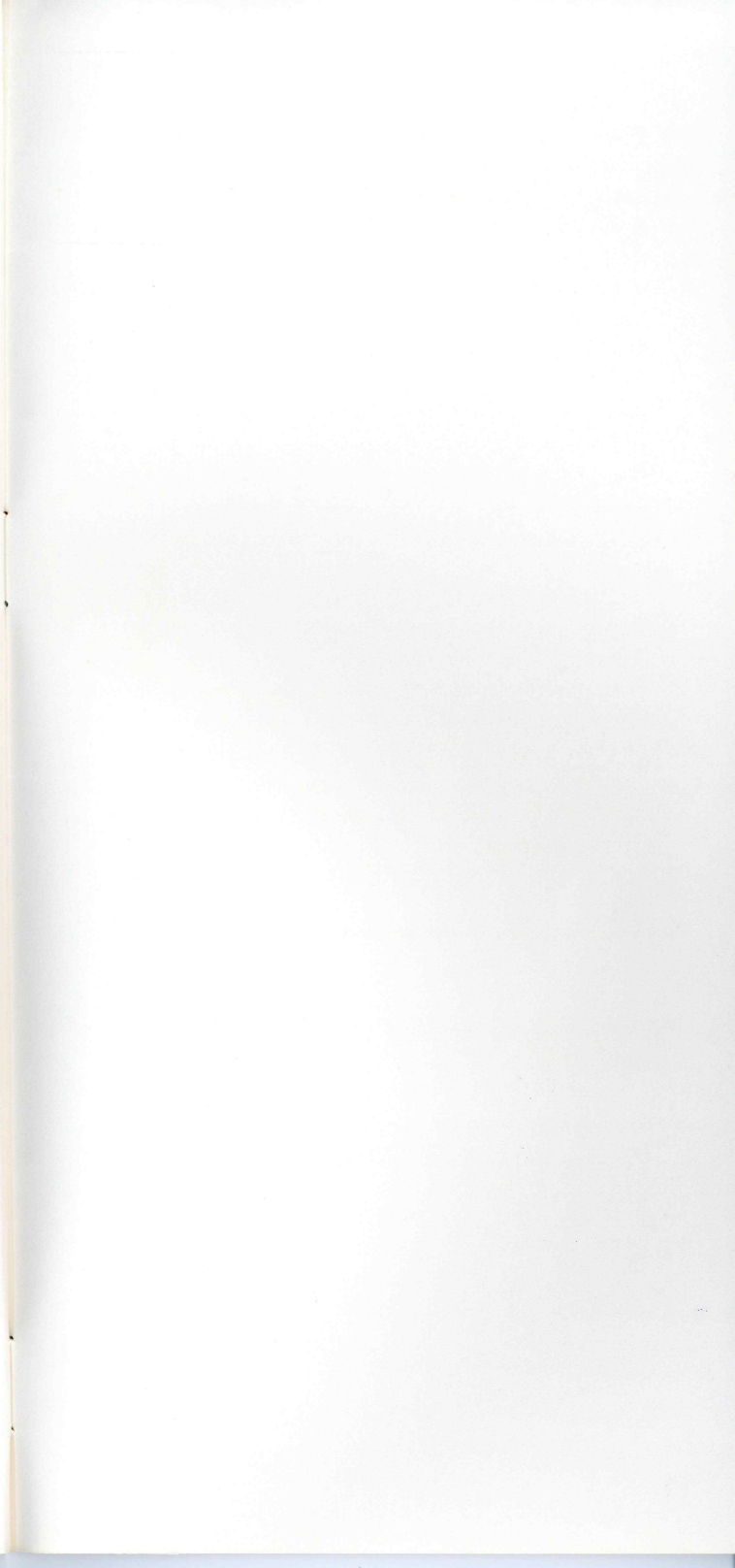
"Your House and Its Site," University of Missouri - Extension Division

"Selection and Use of Curtains and Draperies," University of Missouri-Extension Division

January 1978 issue of "House Beautiful," The Hearst Corporation

There are other bright ideas for saving energy and money. Write:

Energy Information Clearinghouse
Missouri Department of Natural Resources
P. O. Box 1309
Jefferson City, MO 65101



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